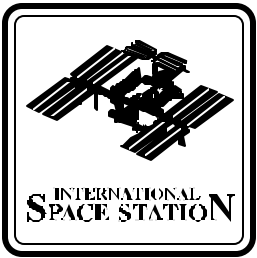


# International Space Station Program Status

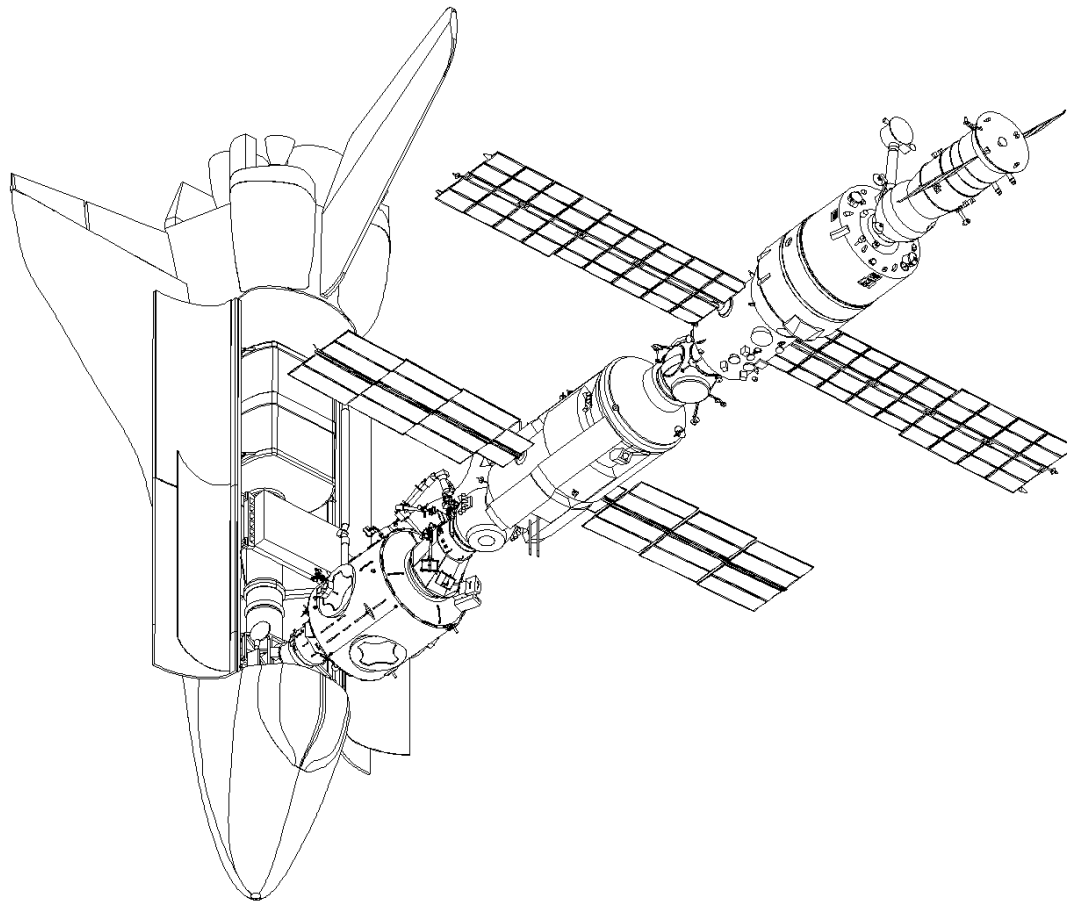
## 2A.2b Flight Readiness Review

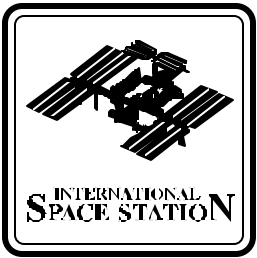


Sharon Castle/LPM  
Aug. 28, 2000



- 2A.2b is the third of three outfitting, maintenance, and logistics missions



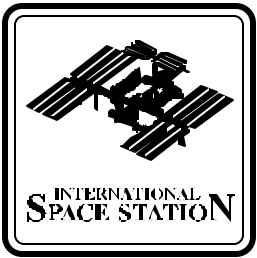


# Table of Contents

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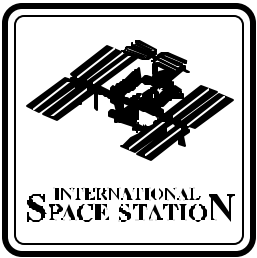
- **Mission Overview**
  - **Flight Content and Status of Task Priority List**
  - **Manifest Content**
  - **Stowage Margins**
- **Hardware Delivery and Certification Status**
- **Special Topics**
  - **12<sup>th</sup> Day Status**
  - **ISS Software Patch Open Work**
  - **Battery Change Out Summary**
- **ISS Program Status**
- **Summary**



# Flight Content



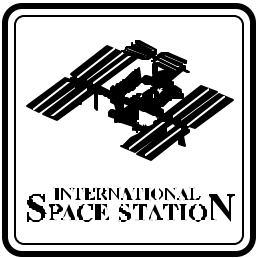
- **11+(1)+2 day flight, (1) = Energy Dependent day, with 5 planned IVA days**
  - Progress Unload – logistics transfer
  - Shuttle Unload – logistics transfer
  - Remove TORU and FGB Aft docking probe
  - FGB Maintenance - Replace FGB Batteries #4 and #6 (Batteries only)
  - Install 2 Service Module Batteries (includes BUPT's and PTAB's)
  - Install remaining Service Module Battery (includes BUPT and PTAB)
  - Remove and replace PTAB for SM Battery #4
  - and TVIS
  - Transfer 8 CWC's of potable water
  - TVIS Checkout
  - 3 Payloads: CGBA (Mid-Deck sortie), MACE II (Transfer only), PCG GN2 Dewar (Transfer only)
  - ECLSS/CHecs tasks
  - SOAR Operations (ISS DTO)
  - Reboost: 1 of 3 hours fit in current timeline, 1 hour is on the Bubble
- **1 Planned EVA Prior to ISS Ingress**
  - EVA: Inspect the SM TORU docking target, Install FGB/SM power cables (4 total), Install Magnetometer pole, Install FGB/SM data and TV cables (4), Install Orlan cable (1)
- **Task Priority List Status:**
  - Verbal commitment from the Russian side to sign the current draft on 8/28
  - Benefits of a potential additional 12<sup>th</sup> day discussed in a Special Topic



# Manifest Content



- **Up and Transfer/Install Items**
  - **Power System Items Installed:**
    - 3 SM Batteries (includes 3 BUPT's and 3 PTAB's), and PTAB for Battery #4
    - 2 FGB Batteries
  - **Power System Items Transferred:**
    - RACU, BUPT, PTAB, 3 MIRTSS (all as FGB spares)
  - **CHeCS Items Installed:**
    - TVIS
  - **CHeCS Items Transferred :**
    - IRED, CO2 monitor kit, Acoustic Counter measures kit, & others
  - **Pre-positioned items for Increment 1 Crew (all items will be transferred)**
    - Portable Breathing Apparatus's (PBA)
    - CO2 removal kit
    - 43 US, 16 Russian food containers, & food warmer
    - 8 CWC's of water (all potable)
    - PEEK (Power Electrical Extension Kit)
    - Hygiene and Office supply Pantry items
    - Laptop and Barcode equipment
    - Ham radio equipment
    - Tool kit, P/TV items

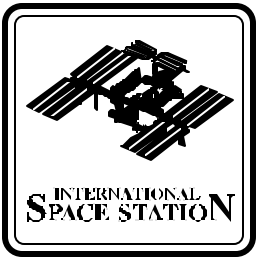


# Manifest Content

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- **Up and Transfer/Install Items (continued)**
  - **Payloads (all items will be transferred) :**
    - **MACE II, PCG GN2 Dewer**
    - **IMAX**
  - **Spares (all items will be transferred)**
    - **MDM 10 CE with updated software and firmware**
    - **RFPDB, SSU cover, Powered Bolt & powered Bolt Nut assembly**
  - **Pre-positioning for 3A items (all items will be transferred)**
    - **48 D-Cell batteries, desiccant bag, vacuum access jumper, MPEV ISA**
- **Down Only Items**
  - **TORU**
  - **Foam and brackets from various systems/hardware**
  - **Magnetometer cover (EVA)**

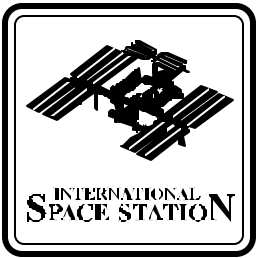


# Stowage Margins

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- **Ascent**
  - Mid-Deck – 2-3 MLE (Mid-deck Locker Equivalents )
  - Spacehab – 5 MLE are “MVAKable”
    - MVAK on 8/28
    - MVAK scheduled for 9/6 (L-40 hours) is currently not required
- **Descent**
  - Mid-Deck – 4 MLE, 240 lbs
  - Spacehab – no margin, mass limited (lots of volume)
    - If additional descent mass is required, then real-time analysis will be required for either loads analysis or down manifest priority
- **On-Orbit**
  - All 2A.2b items can be accommodated in On-orbit stowage
  - An acceptable increment stowage plan/timeline has been developed for 2R



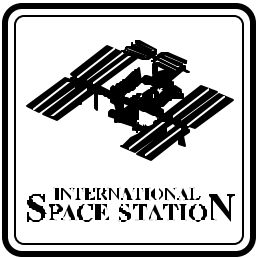
# Hardware Delivery

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- **8 of 143 Items Remain to be Delivered (as of 8/24)**
  - **Threats:**
    - **Russian flood light & cable, Delivery date: TBD**
    - **Russian IMS CD, Delivery date: 9/1 (hand carried)**
  - **Remaining planned deliveries are planned and support late load schedule**



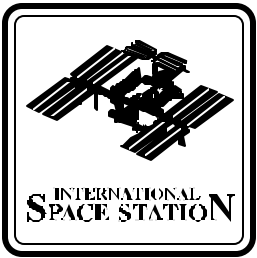


# Hardware Certification (US Approval)

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- **8 of 132 Items Remain to be Certified (as of 8/25)**
  - **6 US items remain open, none are a constraint to launch or transfer**
    - **CO2 Removal Kit (Shipped with open paper, no technical issues), ECD: 8/25**
    - **CRES (Shipped with open paper, no technical issues), ECD: 8/28**
    - **IREC (Shipped with open paper), ECD: 8/28**
    - **OCA Laptop for ECOMM (delivery planned for 9/1), ECD: 9/1**
    - **KU-Band power supply for MACE (no technical issues), ECD: 8/28**
    - **Passive Dosimetry Kit (no technical issues), ECD: 8/29**
  - **2 Russian item remains open**
    - **TORU return, ECD: TBD, Safety Data Package expected on 8/29**
    - **Russian flood light & cable, ECD: TBD**
  - **Threats:**
    - **Russian IMS CD, ECD : TBD**

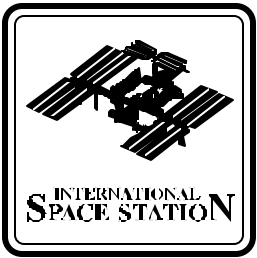


# Hardware Certification (Operation Certification)

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- **COFR2/SORR Exception**
  - **Waivers and “Yellow Tags” required for all items not certified for operational use.**
  - **All Waivers have been drafted and should be signed off 8/28**
  - **Application of “Yellow Tags” identified in Transfer Cue cards (in final review)**
- **2A.2b “Yellow Tag” Status (for items not yet certified for operations)**
  - **12 bags being transferred from the Shuttle**
  - **2 items on the Service Module**
  - **0 items from Progress 1**



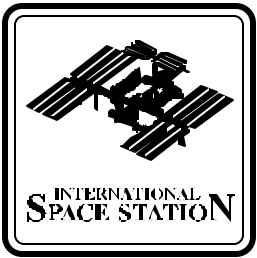
## Special Topics

### 12<sup>th</sup> Day Status

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- The 12<sup>th</sup> day is required to both provide margin for the “packed” 11 day mission and to provide opportunity to complete baselined get ahead tasks
  - The Programs have already committed to constraining the launch window to Rendezvous on Flight Day 3
- An additional 31 lbs of O<sub>2</sub> must be “found” to achieve the 12<sup>th</sup> day.
  - Energy buybacks to gain an additional day on orbit have been identified and prioritized
- If the 12<sup>th</sup> day is not realized, about 15 tasks can not be accomplished

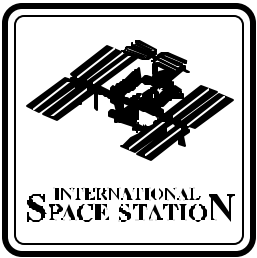


## Special Topics 12<sup>th</sup> Day Status

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- If the 12<sup>th</sup> (energy dependent day is realized) the following tasks can be included in the mission:
  - Monitor Formaldehyde levels in the SM
  - Perform 2<sup>nd</sup> hour of Shuttle Reboost
  - Mechanical installation of the toilet
  - Mechanical installation of the Electron
  - Inspection of a SM Thermal Control Fan
  - SSU ACME screw fit check
  - Installation of 4 ARCU's
  - Setup of Russian Packet Comm System (Wiener Laptop)
  - Install and activate Node 1 Forward/PMA 2 CBM Controllers
  - Remove ground straps from PMA2
  - Monitor Formaldehyde levels in the FGB and NODE
  - Perform 3<sup>rd</sup> hour of Shuttle Reboost
  - Install FGB fire extinguisher labels
  - Perform IMS checkout
  - Unload the Crew Quarters



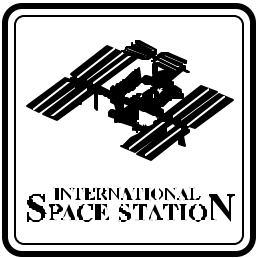
## Special Topic

# ISS Software Patch Open Work

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- The controlling module (FGB or SM) must provide an attitude control signal through the Node Control Software (NCS) to an LED indicator externally mounted in the ISS
  - This indicator visually tells the Shuttle crew whether the ISS is in free drift or in attitude control
  - The ISS must mode to free drift seconds after docking or the Shuttle must undock to avoid excessive loads
- The current on-orbit NCS is configured to look for the attitude control (active or free drift) signal from the FGB.
- This patch will change a “data word” in the NCS so that it will look for the attitude control signal from the Service Module
- This patch has been retested by the NCS Design group and will be tested by on ground Tues 8/29 by Mission Control Center and the Software Verification Facility
- The tentative uplink is scheduled for 9/4



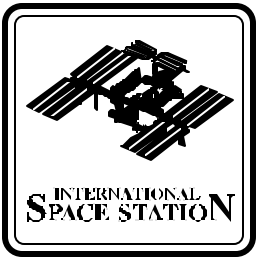
# Special Topic

## Battery Change Out Summary

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- **FGB Battery Summary**
  - What was done on 2A.2a
    - Replace 4 of 6 FGB Batteries (#1, 2, 3, and 5)
    - Replaced 3 PTAB's (#1, 2, 3)
    - Replaced 2 BUPT's (#1, 3)
  - What is planned for 2A.2b
    - Launch and replace final 2 FGB Batteries (#4 and 6)
      - Lifetime issue only, no failures
- **SM Battery Summary**
  - What was launched on 1R
    - 5 of 8 battery strings (battery, PTAB, and BUPT)
  - What is planned for 2A.2b
    - Launch and install of remaining 3 battery strings (battery, PTAB, and BUPT)
    - Replace parts of battery string #4 (PTAB)

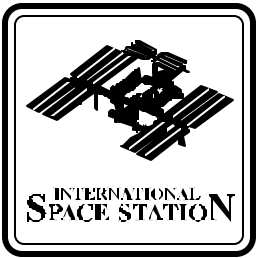


# ISS Program Status

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- **Vehicle Office**
  - Existing stage anomalies have been assessed. Work arounds and corrective procedures developed, identified, and incorporated into 2A.2b procedures
- **Mission Integration and Operations Office**
  - 2A.2b Manifest if finalized and accommodated
  - On-Orbit stowage planning is complete and acceptable
  - ISS Hardware Delivery and Certification processing is complete or planned to be complete
  - Shuttle Program and Operations Integration is on track
  - Increment Management Center and MER Support personnel are qualified
- **Avionics and Software Office**
  - All avionics hardware and software certification activities are complete, except for one software patch open work discussed as a Special Topic
- **Safety and Mission Assurance/Program Risk Office**
  - S & MA analysis and assurance activities are complete for all 2A.2b contractor furnished equipment (CFE), government furnished equipment (GFE) and International Partner (IP) furnished equipment



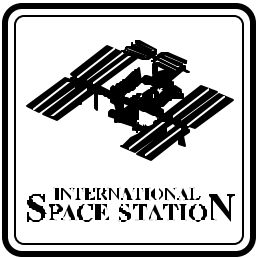
# ISS Program Status

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- **Management Integration Office/Configuration Management**
  - All approved changes, including waivers and exceptions have been verified for incorporation into the baseline
  - The launch package CFE as designed/as built reconciliation is complete and product baseline is captured in the Space Station Accounting and Verification System (SSAV)
  - Exceptions and Waivers
    - 1 Approved Exceptions
    - 3 Approved Waivers
    - 2 Pending Exceptions
    - 14 Pending Waivers and Pending Exception (from SORR)
      - Waivers for hardware not certified for operations (yellow tags), ECD: 8/28
- **Program Integration Office**
  - Vehicle Integrated Performance analyses complete and acceptable
  - Incorporation of the SM/FGB cables and the magnetometer pole installations into the Stage CAD model is complete. The top level assembly drawings are being finalized and will be complete on 8/29.
- **Payloads Office**
  - Payload integration is complete or planned



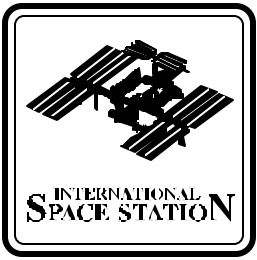


## Summary



- **Flight Objectives are defined**
  - Verbal Russian Concurrence, Signature is in work
- **Flight Manifest has been defined**
- **Ascent, Descent, and On-orbit stowage margins are adequate**
- **Remaining Hardware delivery and processing schedule support launch date**
- **US and Russian Certification schedule supports launch date**
  - Some items will require “yellow tags” to be applied to hardware
- **Special Topics are resolved or planned to be resolved**

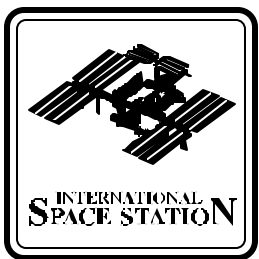
**The ISS Program  
is ready to proceed to  
launch of  
2A.2b / STS-106**



# Backup Charts

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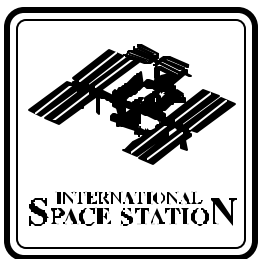


# ISS Configuration Management

## 2A.2b Approved Exceptions



CHANGE ID	TITLE	CHANGE AUTH	REMARKS
SSCN 3408	Request for Exception to SSP 41172, ISS Program Qualification and Acceptance Environmental Test Requirements for Portable Fan Assembly/CO2 Removal Kit	Approved 4/28/00	This exception allows power on/hard mounted acceptance/photoflight random vibration testing of the portable fan assembly (PFA). This exception also, allows the use of the PFA qualification unit fan ORU that has undergone 24 thermal cycles rather than 8 cycles for the CO2 removal kit

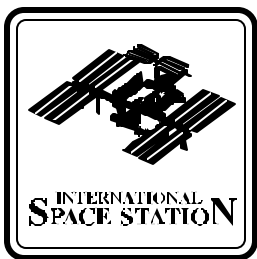


# ISS Configuration Management

## 2A.2b Approved Waivers



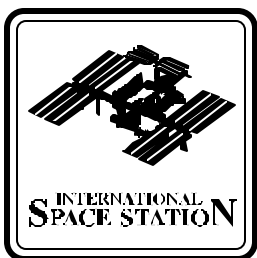
CHANGE ID	TITLE	CHANGE AUTH	REMARKS
SSCN 3312 Rev 2	Request for Waiver - Deficient Configuration Accounting	Approved 8/15/00	Due to deficient as-designed/as-built configuration data elements required in Quality Assurance SSP 30695 ADP data items and/or ground build documentation, Boeing Configuration Management is unable to completely satisfy detailed hardware configuration accounting requirements in SSP 41170
SSCN 3364	Request for Waiver: Node 1 MDM Application (CI#684A4A)	Approved 6/16/00	Waives the N1MA PID requirements for non-compliances for 2A.2b/3A VCNs. The waiver is required to closeout verification paperwork and to accept N1MA for use "as is"
SSCN 3884	Request for Waiver: UOP Touch Temperature Exceedence	Approved 7/28/00	The UOP thermal analysis shows the touch temperature of illuminated pushbuttons used on the UOP are above the SSP 50005 incidental touch temperature requirement of 122 degrees F.



## 2A.2b Pending Exceptions, & Waivers



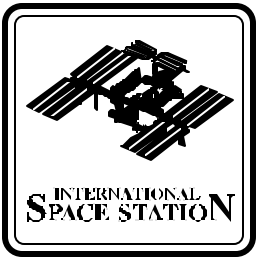
CHANGE ID	TITLE	CHANGE AUTH	REMARKS
SSCN 3746	Exceptions to EME Requirements for SSP 30237, SSP 30240, SSP 30243, and SSP 30245	Pending -	Ensures EME requirements technical baseline reflects approved developed design, which will provide the appropriate requirements allocation to support ARB and CoFR
SSCN 4007	Request for Exception to Below Specification Cabin Ventilation in Node 1 Radial Bay During 2A.2b	Pending -	This exception allows the ventilation in radial bay of Node 1 to be below the required minimum 10 ft/min as specified by SSP 41162R paragraph 3.7.2.3.7 during flight 2A.2b
SSCN 4034	Request for Waiver: Flight 2A.2b Food Warmer Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4035	Request for Waiver: Flight 2A.2b Bar Code Reader Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4036	Request for Waiver: Flight 2A.2b IVA Tool Kit Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4037	Request for Waiver: Flight 2A.2b WNE Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4038	Request for Waiver: Flight 2A.2b DAT PASS Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed



## 2A.2b Pending Exceptions, & Waivers



CHANGE ID	TITLE	CHANGE AUTH	REMARKS
SSCN 4039	Request for Waiver: Flight 2A.2b Photo TV1 Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4040	Request for Waiver: Flight 2A.2b Commercial Equipment Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4041	Request for Waiver: Flight 2A.2b EPCS Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4042	Request for Waiver: Flight 2A.2b PEEK Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4044	Request for Waiver: Flight 2A.2b Fecal Collection Assembly and Urine Collection Device Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4045	Request for Waiver: Flight 2A.2b Apollo Bags Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4046	Request for Waiver: Flight 2A.2b PCG-EGN Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4047	Request for Waiver: Flight 2A.2b Utility Outlet Panel Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed
SSCN 4048	Request for Waiver: Flight 2A.2b Scopemeter and Driver Drill Certification for Use in the Russian Segment	Pending -	Restricts the use of hardware from operating in the Russian segment until Russian certifications forms are signed



# Air Quality Status

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- All indications from 2A.2a indicate overall air quality was acceptable
- However, crews have consistently reported an odor upon ingress into ISS
  - The odor has been described as unpleasant, like contact cement, etc.
  - Grab sample containers (GSC) taken at ingress and egress have shown no compounds above the SMAC
    - Acetaldehyde, xylenes, and butyl acetate have been above odor thresholds on previous flights and would be characterized as a solvent or glue-like smell
- 2A.2b crew will take a sample of the Node 1 air before the charcoal scrub is performed
  - Sample will be taken without ingressing the Node by attaching a GSC to the L-shaped adapter and taking the sample through the external sampling adapter
  - GSC's will also be taken at initial ingress and final egress as normally done
  - Additional GSC's are available for contingency sampling needs
  - Results will be used to determine if modifications to the pre-ingress scrub could be implemented to minimize contaminants causing odor